

# PATENT ABSTRACTS OF JAPAN

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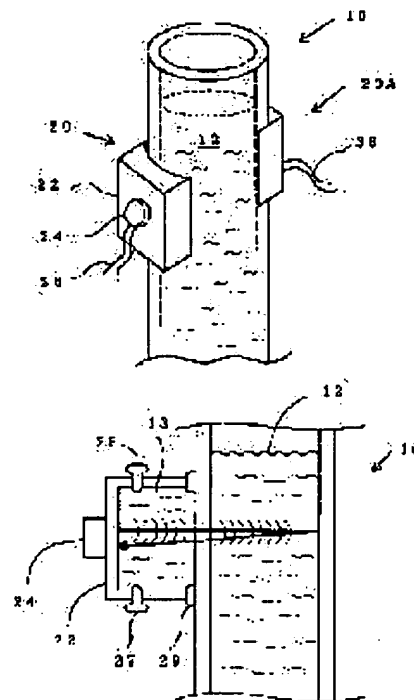
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## (54) ULTRASONIC OSCILLATOR MOUNTING ADAPTOR, AND ULTRASONIC OSCILLATOR ASSEMBLY

(57)Abstract:

**PROBLEM TO BE SOLVED:** To easily mount an ultrasonic oscillator to a measured site even by a person other than a skilled expert, and to provide a desirable ultrasonic propagation characteristic without marring the ultrasonic oscillator.

**SOLUTION:** An ultrasonic oscillator 24 is preliminarily bonded to an outside of a prescribed casing 22, and mounted to fill an opening of the casing 22 with a mounting site in a container 10 of a measured object. After confirming that a drain cock 27 is completely closed, a water feed cock 28 is opened to pour water into inner spaces of a pair of ultrasonic oscillator assemblies 20, 20A. Water is filled at least upto a height level of the ultrasonic oscillator 24 or more. Although water is used here, any of an ultrasonic wave propagating liquid, such as a machine oil, other oil or other liquid, is acceptable for this use instead of water. After finish of the water filling, the water feed cock 28 is closed, and then detection operation is started.



## LEGAL STATUS

[Date of request for examination]

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CLAIMS

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[Claim(s)]

[Claim 1] The ultrasonic vibrator installation adapter by which it has opening which carries out opening to the installation section in a measured location, the crevice which can hold a liquid inside when said opening is closed by said installation section, and casing which forms said crevice, it is a part of said casing, and a hole to constitute possible that the outer surface section of the part which counters said opening attaches an ultrasonic vibrator, and inject said liquid into said casing is prepared.

[Claim 2] The ultrasonic vibrator installation adapter according to claim 1 by which said hole is prepared in the upper part in the busy condition of said casing, and the hole for wastewater is prepared in the lower part in the busy condition of said casing.

[Claim 3] The ultrasonic vibrator installation adapter according to claim 1 which has further the means closed for the hole for pouring in said liquid, enabling free closing motion.

[Claim 4] When opening which carries out opening to the installation section in a measured location, and said opening are closed by said installation section, It has casing which forms in the interior the crevice which can hold a liquid, and said crevice. Are said a part of casing and it is constituted possible that the outer surface section of the part which counters said opening attaches an ultrasonic vibrator. And the ultrasonic vibrator installation adapter by which the conduit for making the air bubbles in said liquid discharge is formed after are open for free passage inside said casing and pouring said liquid into the interior of said casing.

[Claim 5] It is the ultrasonic vibrator installation adapter according to claim 4 which has further the means which the hole for pouring said liquid into said conduit is prepared, and said hole has in the location higher than the oil level of the liquid held in the interior of said crevice at the time of the busy condition which turned said opening upward, and closes said hole free [ closing motion ].

[Claim 6] The ultrasonic vibrator installation adapter according to claim 1 or 4 by which the elastic member is attached in the edge which demarcates said opening.

[Claim 7] The ultrasonic vibrator installation adapter according to claim 1 or 4 which established a means to have answered this and to make said casing reduce the pneumatic pressure inside said crevice when the pneumatic pressure inside said crevice is beyond a predetermined value in a busy condition.

[Claim 8] The ultrasonic vibrator assembly with which it is a part of opening which carries out opening to the installation section in a measured location, crevice which can hold a liquid inside when said opening is closed by said installation section, casing which forms said crevice, and said casing, and the hole for having the ultrasonic vibrator attached in the outer surface section of the part which counters said opening, and injecting said liquid into said casing is prepared.

[Claim 9] When opening which carries out opening to the installation section in a measured location, and said opening are closed by said installation section, Casing which forms in the interior the crevice which can hold a liquid, and said crevice, The ultrasonic vibrator assembly which are a conduit for making the air bubbles in said liquid discharge, and said a part of casing, and has the ultrasonic vibrator attached in the outer surface section of the part which counters said opening after are open for free passage inside said casing and pouring said liquid into the interior of said casing.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] It is related with the ultrasonic vibrator installation adapter and ultrasonic vibrator assembly which the installation to a measurement location is easy, and is stabilized about an ultrasonic vibrator installation adapter and an ultrasonic vibrator assembly by especially this invention, and enable detection actuation.

[0002]

[Description of the Prior Art] There is an approach using an ultrasonic vibrator as one of the approaches which detects the tank containing a liquid, the existence of the liquid of the interior, such as a pipe, and the height (level) of an oil level from the former. That is, existence of the liquid inside a container is detected by giving the supersonic wave generated from an ultrasonic vibrator to the interior from the exterior of a container, and detecting the transmitted wave or reflected wave (echo). In order to attach an ultrasonic vibrator in a measured location, it pushes against a measured location and is made for the installation part of the outer wall of a container to be washed beforehand, or to be polished, and to make cup RANTO (cement), such as grease, the clamp face of an ultrasonic vibrator with \*\*, and to carry out the pressure welding of the whole ultrasonic vibrator with a strong bolting belt etc. to a container further. Thus, cup RANTO is made with \*\* the plane of composition of an ultrasonic vibrator, and a pressure welding is carried out to a measured location for the supersonic wave generated from the ultrasonic vibrator enabling it to spread inside a container efficiently.

[0003]

[Problem(s) to be Solved by the Invention] However, when the worker in a site has become skillful, although it is satisfactory in any way, since the propagation property of the supersonic wave from an ultrasonic vibrator to a container is not known in the case of general contractors other than a vendor, and those who deal with an ultrasonic vibrator for the first time, there are the following problems. That is, these persons only bind tight by a belt etc. mechanically, think that what is necessary is just to press an ultrasonic vibrator in a container, and he does not understand the role of cup RANTO in the contact surface enough, but, therefore, an installation condition is sometimes often widely different from an ideal. Consequently, an ultrasonic vibrator is bound tight too much, a crack arises in the casing, or an ultrasonic propagation property is remarkably bad and fault with an undetectable request occurs. When such a situation arises, a user will recognize it as it being the defect of the ultrasonic vibrator itself, it will become a claim to an ultrasonic vibrator manufacturer, and returned goods will occur frequently.

[0004] Therefore, this invention aims at offering the ultrasonic vibrator installation adapter and ultrasonic vibrator assembly which can acquire a desired ultrasonic propagation property, without persons other than the skilled vendor also being able to attach easily, and damaging an ultrasonic vibrator.

[0005]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the ultrasonic vibrator is beforehand pasted up on the exterior of predetermined casing, it attaches so that it may be closed by

the installation location of a container whose opening of casing is a device under test, and it constitutes from this invention so that a liquid may be put into the interior of casing after that and the supersonic wave from an ultrasonic vibrator may spread inside a container good.

[0006] Namely, when opening which carries out opening to the installation section in a measured location, and said opening are closed by said installation section according to this invention, It has casing which forms in the interior the crevice which can hold a liquid, and said crevice. It is said a part of casing, and the ultrasonic vibrator installation adapter by which the hole to constitute possible that the outer surface section of the part which counters said opening attaches an ultrasonic vibrator, and inject said liquid into said casing is prepared is offered.

[0007] Moreover, when opening which carries out opening to the installation section in a measured location, and said opening are closed by said installation section according to this invention, It has casing which forms in the interior the crevice which can hold a liquid, and said crevice. Are said a part of casing and it is constituted possible that the outer surface section of the part which counters said opening attaches an ultrasonic vibrator. And after pouring said liquid into the interior of said casing, the ultrasonic vibrator installation adapter by which the conduit for making the air bubbles in said liquid discharge is formed is offered.

[0008] Moreover, when opening which carries out opening to the installation section in a measured location, and said opening are closed by said installation section according to this invention, Casing which forms in the interior the crevice which can hold a liquid, and said crevice, It is said a part of casing, and it has the ultrasonic vibrator attached in the outer surface section of the part which counters said opening, and the ultrasonic vibrator assembly with which the hole for injecting said liquid into said casing is prepared is offered.

[0009] Moreover, when opening which carries out opening to the installation section in a measured location, and said opening are closed by said installation section according to this invention, Casing which forms in the interior the crevice which can hold a liquid, and said crevice, The conduit for making the air bubbles in said liquid discharge, after are open for free passage inside said casing and pouring said liquid into the interior of said casing, It is said a part of casing, and the ultrasonic vibrator assembly which has the ultrasonic vibrator attached in the outer surface section of the part which counters said opening is offered.

[0010]

[Embodiment of the Invention] Hereafter, with reference to a drawing, the gestalt of desirable implementation of the ultrasonic vibrator assembly of this invention is explained. Drawing 1 is the perspective view showing the busy condition of the ultrasonic vibrator assembly concerning this invention. In order for the measuring object (device under test) to have presupposed that it is the pipe 10 of the shape of a cylinder as a container, and for the liquid 12 to be contained in the interior of a pipe 10 and to detect the existence or level of the existence, an ultrasonic vibrator assembly shall be used. In addition, although the dotted line showed the liquid 12 for convenience, it cannot be overemphasized that the interior cannot be seen when a pipe 10 is opaque. The gestalt of operation shown in drawing 1 is the so-called transparency mold, and is the configuration of receiving the supersonic wave which attached two ultrasonic vibrator assemblies 20 and 20A so that the installation location where a pipe 10 counters might be countered mutually, and was transmitted from one side on the other hand. Since the structure of two ultrasonic vibrator assemblies 20 and 20A is completely the same, only one is explained. The ultrasonic vibrator assembly 20 has the ultrasonic vibrator installation adapter and the ultrasonic vibrator 24 fundamentally. The ultrasonic vibrator installation adapter has casing 22 and the add-on mentioned later.

[0011] Drawing 2 and drawing 3 explain further the configuration of the ultrasonic vibrator assembly 20 of drawing 1. Casing 22 is box-like [ made of a metal or synthetic resin ], as shown in drawing 3, it has opening 25, and it has central regions-of-back 22C connected with up wall 22T surrounding this opening 25, lower wall 22B, the both-sides walls 22L and 22R, and these walls 22T, 22B, 22L, and 22R. This opening 25 can hold a liquid inside, when opening is carried out to the installation section in a measured location, opening 25 attaches and it is closed by the section, as shown in drawing 1.

[0012] That is, the interior of casing 22 is a crevice for holding a liquid. As shown in drawing 2, the rubber seal 29 as an elastic member is attached in the edge which demarcates opening 25 (in drawing 1 and drawing 3, since it is simple, the illustration abbreviation of the rubber seal 29 is carried out). Moreover, it is a part of outside 22 of central regions-of-back 22C, i.e., casing, and the ultrasonic vibrator 24 is stuck on the outer surface section of the part which counters opening 25 with adhesives. In addition, in this invention, the thing in the condition of having attached the ultrasonic vibrator 24 is called an ultrasonic vibrator assembly, and the condition before attaching an ultrasonic vibrator 24 is called an ultrasonic vibrator installation adapter. 26 is the lead wire of an ultrasonic vibrator 24, and is connected to predetermined ultrasonic oscillation equipment and/or a predetermined ultrasonic receiving set.

[0013] The irrigation cock 28 who closes the hole for pouring in a liquid and this is formed in up wall 22T (it becomes the upper part by the busy condition of casing). The irrigation cock 28 is a screw type and is removable to a hole. Moreover, the hole for wastewater is prepared in lower wall 22B (it becomes the lower part by the busy condition of casing), and the removable drain cock 27 is similarly attached in it by the screw formula. In addition, to up wall 22T, although the illustration abbreviation is carried out, when the interior of a crevice, i.e., the internal pneumatic pressure of casing 22, is beyond a predetermined value, it is desirable to establish a means to answer this and to reduce the pneumatic pressure inside a crevice. As a means to reduce pneumatic pressure, when it becomes fixed pneumatic pressure, for example, 1.1 atmospheric pressures, the insurance bulb which deforms in the direction of the exterior from the interior, and is made to increase the internal volume, or can emit an excess atmospheric pressure can be used.

[0014] The gestalt of operation of drawing 1 - drawing 3 operates as follows. As shown in drawing 1, one pair of ultrasonic vibrator assemblies 20 and 20A made to operate with a transparency mold are attached in the location which is near [ which wishes level detection of a pipe 10 ] the location, and counters 180 degrees. At this time, in the band of an illustration abbreviation, one pair of ultrasonic vibrator assemblies 20 and 20A are bound tight to a pipe 10, and it fixes so that the rubber seal 29 around opening 25 may carry out elastic deformation moderately. Next, a drain cock 27 checks that it is in the condition closed completely, opens the irrigation cock 28 wide, and pours water into the building envelope of one pair of ultrasonic vibrator assemblies 20 and 20A, respectively. Irrigation is performed to more than the height location of an ultrasonic vibrator 24 at least. Although water is used here, if it is the liquid which spreads not only water but a supersonic wave, machine oil, other oils, or other liquids can be used.

[0015] If irrigation is completed, the irrigation cock 28 will be closed and detection actuation will be started. in addition, what is necessary is just to fix a single ultrasonic vibrator assembly by a belt etc. like the flank of a pipe 10 instead of boiling a pipe 10 and attaching one pair of ultrasonic vibrator assemblies 20 and 20A, when using an ultrasonic vibrator assembly as an echo mold, as shown in drawing 4

[0016] Drawing 5 is the sectional view showing the gestalt of other operations. This ultrasonic vibrator assembly can be used good, in order to measure the depth (depth of water) of the liquid in containers, such as a tank and a pipe. That is, as basic structure as drawing 2 R> 2 and drawing 3 explained, it has casing 22, opening, and an ultrasonic vibrator 24, and it is attached so that opening may become lower limit parts, such as a pipe 14, with the upper part. If only a different point is explained, first, the hole for irrigation is not directly prepared in casing 22, and the conduit 33 elongated in the upper part in a busy condition from casing 22 is formed. That is, while a conduit 33 is open for free passage inside casing 22 and pouring a liquid into the casing 22 interior, it is used in order to discharge the residual air bubbles after impregnation completely, and the irrigation cock 35 is attached in tip opening.

[0017] In addition, tip opening needs to be located above the oil level of the liquid in casing 22 by the busy condition. Moreover, the drain cock 37 who closes the hole for wastewater and it is formed in central regions-of-back 32C of casing 22. With the gestalt of this operation as well as the gestalt of previous operation, the rubber seal 39 is formed, and it is bound tight and attached to a pipe 14. Moreover, when the pneumatic pressure inside casing 32 is beyond a predetermined value like the

gestalt of the 1st operation, it is a desirable mode to establish a means to answer this and to reduce internal pneumatic pressure. Although one conduit 33 is formed with the gestalt of operation of drawing 5, in order to make the air part near the lower limit of a pipe 14 open for free passage outside and to emit the air bubbles in water completely, it is desirable to form a conduit 33 also in the left-hand side in drawing.

[0018]

[Effect of the Invention] As explained above, according to this invention, the ultrasonic vibrator is beforehand pasted up on the exterior of predetermined casing. Since it constituted so that it may attach so that it may be closed by the installation location of a container whose opening of casing is a device under test, and a liquid might be put into the interior of casing after that and the supersonic wave from an ultrasonic vibrator might spread inside a container good A desired ultrasonic propagation property can be acquired without persons other than the skilled vendor also being able to attach an ultrasonic vibrator in a measured location easily, and damaging an ultrasonic vibrator.

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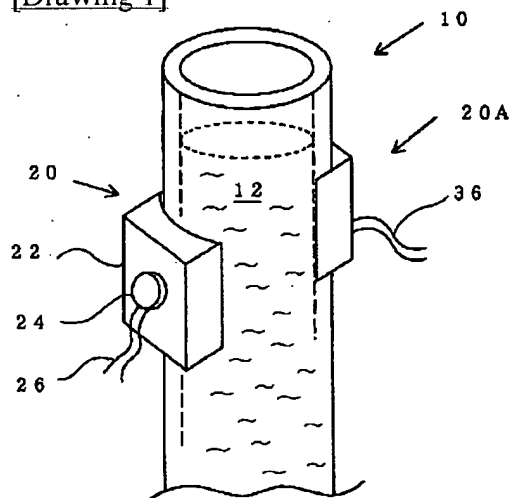
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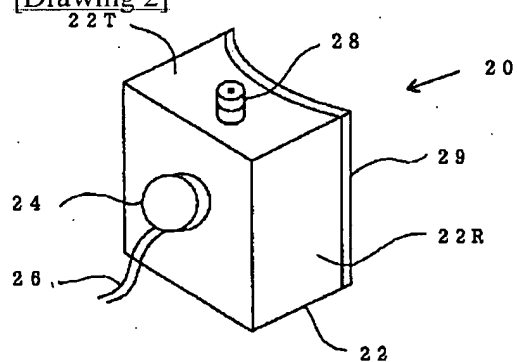
DRAWINGS

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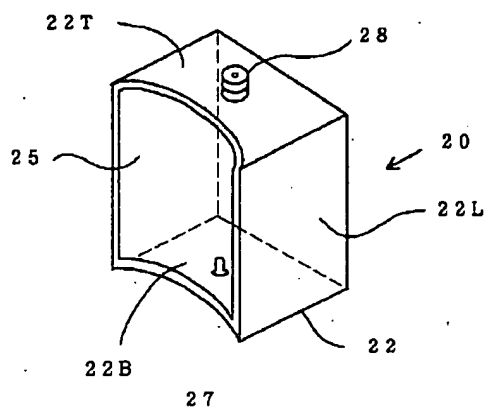
[Drawing 1]



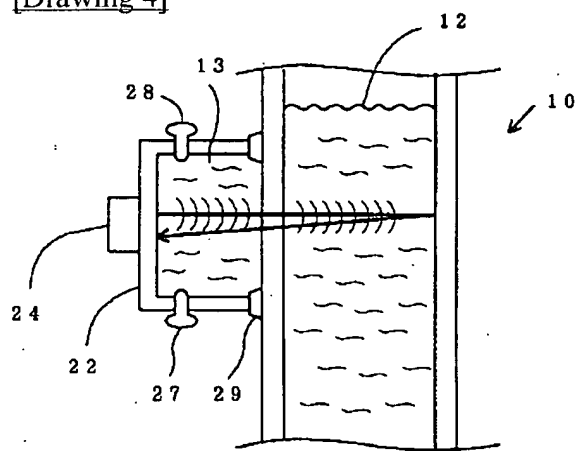
[Drawing 2]



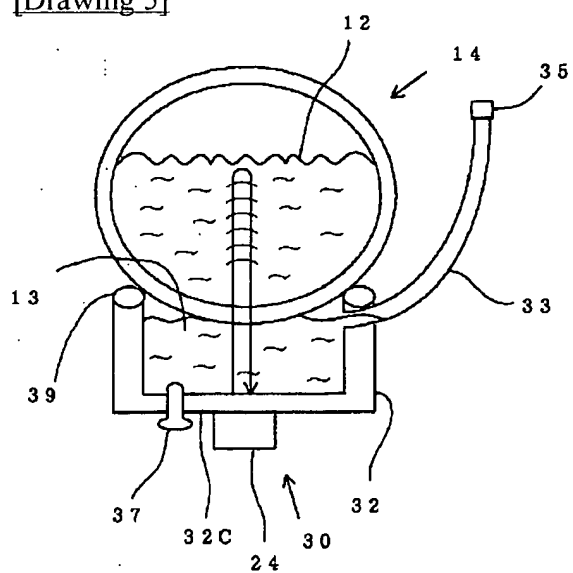
[Drawing 3]



[Drawing 4]

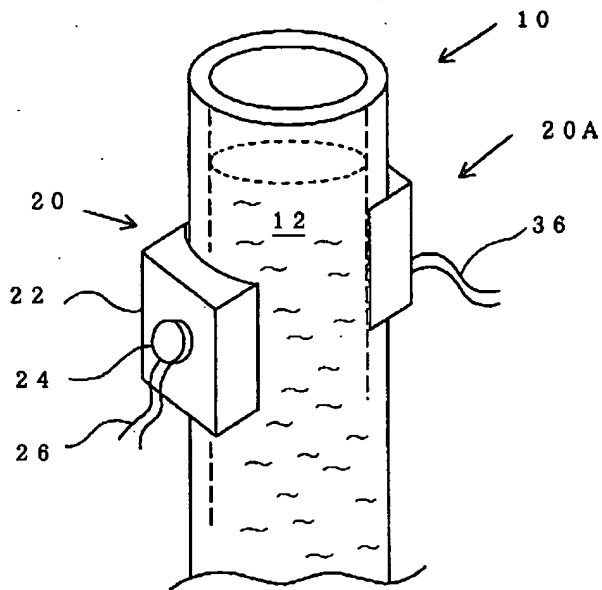


[Drawing 5]



[Translation done.]



Drawing selection ☒ Representative drawing

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the perspective view showing the condition of use of the gestalt of desirable implementation of the ultrasonic vibrator assembly concerning this invention.

[Drawing 2] It is the expansion perspective view of the ultrasonic vibrator assembly of drawing 1.

[Drawing 3] It is the perspective view showing the interior of the ultrasonic vibrator assembly of drawing 1.

[Drawing 4] It is a sectional view explaining the actuation at the time of using the ultrasonic vibrator assembly concerning this invention as an echo mold.

[Drawing 5] It is the sectional view showing the condition of use of the gestalt of other operations with the desirable ultrasonic vibrator assembly concerning this invention.

[Description of Notations]

- 10 Container (Device under Test)
- 12 Liquid in Container
- 13 Liquid in Casing
- 20 20A Ultrasonic vibrator assembly
- 22 Casing
- 24 Ultrasonic Vibrator
- 25 Opening
- 27 37 Drain cock
- 28 35 Irrigation cock
- 29 39 Rubber seal
- 33 Conduit

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[Translation done.]